

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Craig I. Walker, et al.

Serial No.: 10/560,463

Filed: December 14, 2005

For: IMPROVED PUMP IMPELLER

Examiner: Dwayne J. White

Group Art Unit: 3745

Attorney Docket No.: 3387.WWAR.PT

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence along with any attachments referred to or identified as being attached or enclosed is being deposited with the United States Postal Service as First Class Mail (under 37 C.F.R. § 1.8(a)) on the date of deposit shown below with sufficient postage and in an envelope addressed to MAIL STOP AMENDMENT Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450.

Date of Deposit

Signature of registered practitioner or other person having reasonable basis to expect mailing to occur on date of deposit shown pursuant to 37 C.F.R. § 1.8(a)(1)(ii)

Julie K. Morris  
Typed/printed name of person whose  
signature is contained above

**DECLARATION OF CRAIG I. WALKER**

I, Craig I. Walker, make the following statements under oath:

1. I am an inventor of the invention described and claimed in pending U.S. Serial No. 10/560,463 for an IMPROVED PUMP IMPELLER.
2. I am submitting this oath under 37 C.F.R. § 1.132 in support of the non-obviousness and patentability of pending claims 14-16 of the referenced application.
3. Claims 14-16 each recite an impeller where the dimension Db of the auxiliary vanes of the impeller is less than the dimension Da of the shroud of the impeller, where Db is defined as the distance from the rotational axis of the impeller to an outer peripheral edge of the auxiliary vane and Da is defined as the distance from the rotational axis of the impeller to an outer peripheral edge of the pumping vanes.
4. Claims 14-16 are rejected as being obvious in view of U.S. Patent No. 1,881,723 to Lee. The Examiner states that since the present specification does not disclose that having the claimed dimensions solves any stated problem or is of any particular purpose above the fact that the ratios reduce wear on the auxiliary blades, the

*ll*

**BEST AVAILABLE COPY**

blades of the Lee reference would perform equally as well and that it would be a matter of design choice to have the claimed dimensions

5. I have read the Lee reference and note that the Lee patent does not provide any disclosure or discussion concerning the dimensions of the vanes (9 and 10) relative to the dimension of the side walls (7 and 8), and the reference does not acknowledge any appreciation of what effect the difference in those dimensions might have in the life of the impeller.

6. I have provided with this oath pictorial and graphical proof that the ratio between the dimensions  $D_b$  and  $D_a$  play an important role in the operation life of the impeller. Exhibit "A" is a photograph of an impeller of the present invention where the ratio between the auxiliary vanes (i.e., expelling vanes) dimension  $D_b$  and the pumping vane dimension  $D_a$  is 95%. It can be seen that some damage is sustained by the auxiliary vanes.

7. By contrast, attached Exhibit "B" is a photograph of an impeller of the present invention where the ratio between the auxiliary vanes  $D_b$  and the pumping vanes  $D_a$  is 85%. It can be seen that there is relatively little damage sustained by the auxiliary vanes.

8. Attached Exhibit "C" is a photograph of an impeller of the present invention where the auxiliary vanes are of a different shape from those shown in Exhibit "A" and Exhibit "B," the vanes being a fan shape. The ratio  $D_b$  to  $D_a$  of the impeller shown in Exhibit "C" is 85%, and it can be seen that the auxiliary vanes are substantially undamaged.

9 By way of comparison, attached Exhibits "D" through "F" are three photographs showing prior art impellers where the ratio of  $D_b$  to  $D_a$  is 100%. It can be seen that the auxiliary vanes of the impeller have sustained considerable damage, particularly in the impeller shown in Exhibit "F."

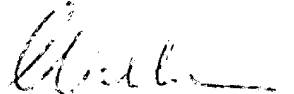
10. The chart of attached Exhibit "G" further supports the photographic evidence and illustrates that when the ratio between  $D_b$  and  $D_a$  is 95% or greater, the

amount of thickness remaining at the periphery of the expelling vanes following typical operation of the pump results in from zero percent to 60% thickness remaining. However, the lower the ratio between  $D_b$  and  $D_a$  (i.e., when the auxiliary vane is of increasingly less dimension compared to the dimension of the shroud), the more thickness remains in the auxiliary vane throughout typical operation of the pump.

11. The Lee patent does not recognize the significance of the ratio  $D_b/D_a$  and its effect on the life of the impeller in slurry processing. The ratio and the claimed dimensions are not obvious from the Lee reference and are not merely obvious design choices. The ratios and dimensions claimed were discovered by the inventors and were specifically developed to maximize the operating life of the impeller.

12. I hereby declare that the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Executed this 8<sup>th</sup> day of January 2007.

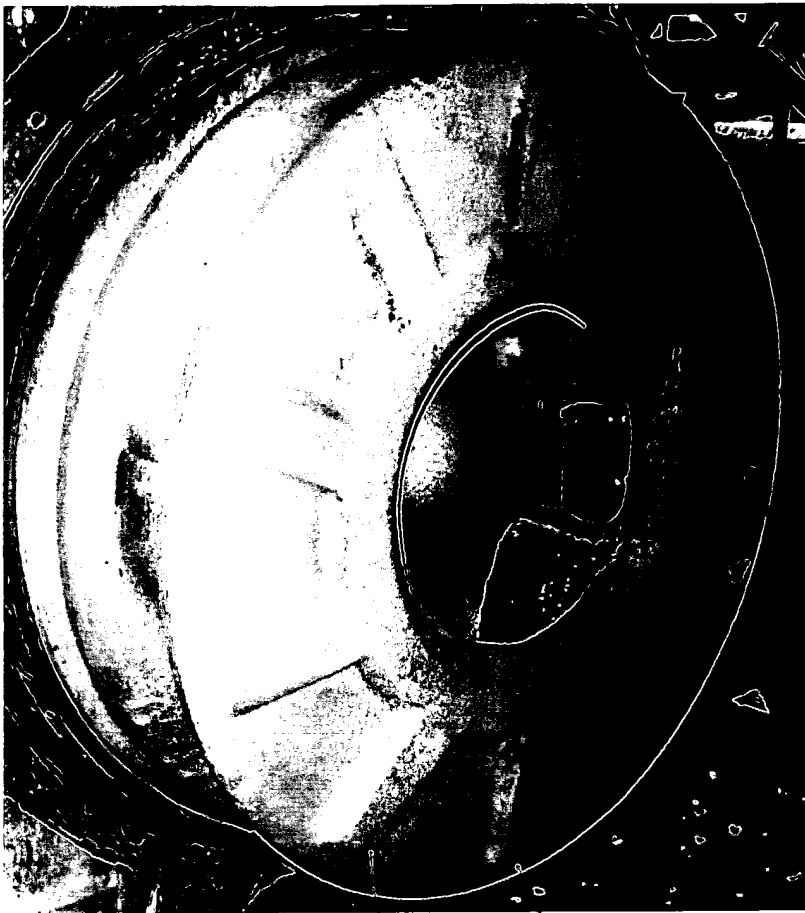
  
\_\_\_\_\_  
Craig I. Walker



AUXILIARY VANES

EXHIBIT "A"

BEST AVAILABLE COPY



**AUXILIARY VANES**

**EXHIBIT "B"**

**BEST AVAILABLE COPY**



**AUXILIARY VANES**

**EXHIBIT "C"**

**BEST AVAILABLE COPY**



**EXHIBIT "D"**

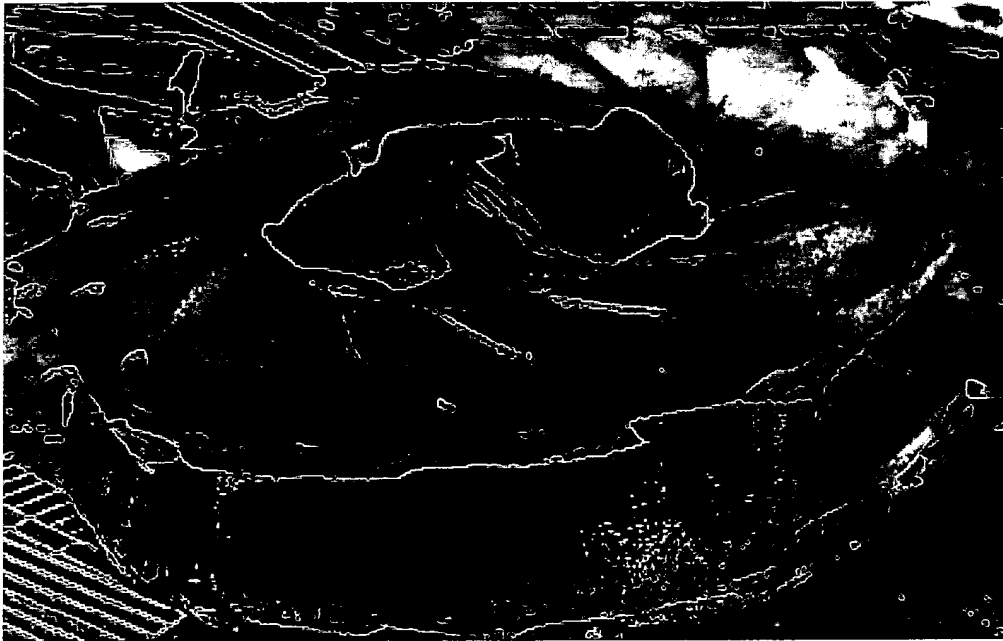
**BEST AVAILABLE COPY**



**EXHIBIT "E"**

**BEST AVAILABLE COPY**



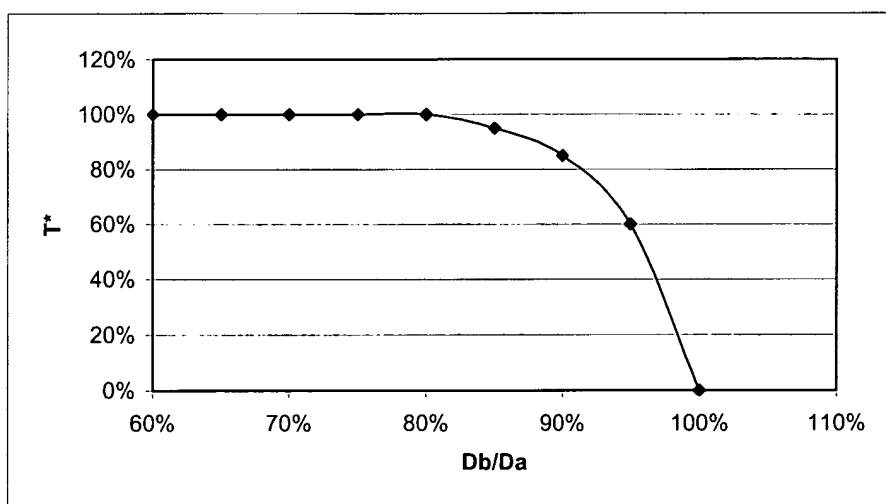


**EXHIBIT "F"**

**BEST AVAILABLE COPY**

T*	Db/Da
0%	100%
60%	95%
85%	90%
95%	85%
100%	80%
100%	75%
100%	70%
100%	65%
100%	60%

\*% of shroud thickness remaining at periphery  
at a point just behind (and downstream) of the  
expelling vane tip after similar time of operation



**EXHIBIT "G"**

**BEST AVAILABLE COPY**